

UNITED STATES DISTRICT COURT  
WESTERN DISTRICT OF WASHINGTON AT SEATTLE

HYPERION VOF, a Belgian General  
Partnership,

Plaintiff,

v.

AMINO DEVELOPMENT CORPORATION, a  
Washington corporation, previously known as  
Amiga, Inc., a Washington corporation;

Defendant.

No.

**HYPERION'S COMPLAINT AGAINST  
AMINO DEVELOPMENT  
CORPORATION**

COMES NOW plaintiff Hyperion VOF and, for its Complaint against Amino  
Development Corporation, previously known as Amiga, Inc., a Washington corporation  
(hereinafter "Amiga Washington"), alleges as follows:

**I. JURISDICTION**

1. This Court has jurisdiction over this action under 28 U.S.C.  
§1332(a)(3)(diversity), 28 U.S.C. §1367 (supplemental jurisdiction), and the doctrines of  
ancillary and pendent jurisdiction. The amount in controversy exceeds a sum or value of  
\$75,000, exclusive of interest and costs.

## II. VENUE

2. Venue is proper in this District because defendant Hyperion VOF stipulated to jurisdiction and venue in this District in an (OEM) License and Software Development Agreement dated November 3, 2001 (the "Agreement") with Amiga Washington and Eyetech Group Ltd. ("Eyetech"). In the Agreement, Hyperion and Eyetech are referred to collectively as the "Amiga One Partners."

## III. PARTIES

3. Hyperion VOF, d/b/a Hyperion Entertainment VOF ("Hyperion"), is a foreign general partnership organized under the laws of Belgium with its principal place of business in Belgium.

4. Defendant Amiga Washington is a Washington corporation that was incorporated in this state on September 30, 1999. It was assigned UBI Number 601983734 by the Washington Secretary of State. Amiga Washington's license expired on September 30, 2004, and it was subsequently administratively dissolved.

5. As demonstrated by the attached printout from the Washington Secretary of State, Amiga Washington's name and dissolved status remained the same through at least May 4, 2007, when Exhibit A hereto was printed from the state website.

6. Sometime prior to August 29, 2007, Amiga Washington changed its name to Amino Development Corporation, as is demonstrated by Exhibit B hereto, which bears the same UBI number as appears on Exhibit A. As shown by both Exhibit A and B, the registered agent for Amiga Washington remained the law firm of Cairncross & Hempelmann PS.

7. On information and belief, shortly after Exhibit B was printed from the Washington Secretary of State's website, but in any event no later than October 11, 2007, Amiga Washington's registered agent, Cairncross & Hempelmann, resigned. Amiga Washington has failed to appoint a successor registered agent, as is demonstrated by Exhibit C. Amiga Washington continues to have no successor registered agent as of October 31, 2007.

8. As a result of Amiga Washington's failure to appoint a successor registered agent, the Washington Secretary of State is defendant's statutory agent for service of process. RCW 23B.05.040(2).

#### IV. FACTS

9. Hyperion is a party to the Agreement, a true, accurate and complete copy of which is attached hereto as Exhibit D.

10. Amiga Washington was a party to the Agreement.

11. Amiga Washington was insolvent no later than the end of July 2002 up through and including April 24, 2003.

12. Upon Amiga Washington's insolvency, the self-executing provision in §2.07 of the Agreement transferred to Hyperion and Eyetech "an exclusive, perpetual, world-wide and royalty free right and license to develop (at their sole expense), use, modify and market the Software and OS 4 under the 'Amiga OS' trademark."

13. Amiga Washington remained insolvent from April 24, 2003 through the date of its administrative dissolution by the State of Washington on September 30, 2004.

14. Hyperion did not know, on or before April 24, 2003, that Amiga Washington was insolvent.

15. On April 24, 2003, Hyperion and Itec LLC ("Itec") entered into an agreement that purported to relate to Amiga Washington's rights under the Agreement. This contract is hereinafter referred to as the "Itec Contract."

16. Amiga Washington did not give its prior written consent to the Itec Contract.

17. Eyetech did not give its prior written consent to the Itec Contract.

18. On information and belief, a common core of major investors, shareholders, officers and directors were directly involved in the affairs of Amiga Washington and Itec on and prior to April 24, 2003. This common core of individuals included Mr. William McEwen, Mr. Barrie Jon Moss, Mr. Pentti Kouri and Mr. John Grzymala. Itec, and this common core of

1 major investors, shareholders, officers and directors were therefore "insiders" of Amiga  
2 Washington within the meaning of RCW 19.40.011.

3 19. At the time of the Itec Contract, Itec and the other insiders of Amiga Washington  
4 knew that Amiga Washington was insolvent.

5 20. Amiga Washington, its representatives, Itec LLC, and its representatives, failed  
6 to inform Hyperion on or before April 24, 2003, that Amiga Washington was insolvent.

7 21. On information and belief, on, before and after April 24, 2003, Itec failed to give  
8 Amiga Washington a reasonably equivalent value for Amiga Washington's contractual rights  
9 that were the subject of the Itec Contract.

10 22. On information and belief, Itec and the other insiders of Amiga Washington  
11 acted in bad faith when Itec entered into the Itec Contract.

12 23. At the time of the Itec Contract, Hyperion was a creditor of Amiga Washington  
13 because, for instance, Amiga Washington had breached its warranties in Article IV of the  
14 Agreement, to the substantial damage of Hyperion.

15 24. On information and belief, the purported transfer to Itec in the Itec Contract of  
16 Amiga Washington's rights under the Agreement, if any such rights existed following Amiga  
17 Washington's insolvency, was made by Itec and its insiders with the actual intent to hinder,  
18 delay or defraud creditors of Amiga Washington, including Hyperion.

19 25. Because of §2.07 of the Agreement, and because of the failure of Itec to obtain  
20 prior written consent as required by §7.12 of the Agreement, the Itec Contract is invalid, void  
21 and otherwise unenforceable.

22 26. Amiga Washington admitted in a contract purportedly dated August 30, 2004,  
23 and entered into with KMOS, Inc., a Delaware corporation, that it (Amiga Washington) was in  
24 default on a Loan Facility Agreement between it and Itec LLC, dated May 11, 2003, that it was  
25 unable to obtain funding to continue its business, and that it had no money to meet its  
26 obligations or to pay for additional legal expenses, including the legal expenses of bankruptcy.

1           27.     The insiders of KMOS are the insiders of Amiga Washington. KMOS and its  
2 insiders knew that Amiga Washington was insolvent on and before August 30, 2004, assuming  
3 that that was in fact when the Amiga Washington/KMOS Contract was signed. Amiga  
4 Washington and KMOS, therefore, acted in bad faith when they entered into that contract with  
5 the actual intent to hinder, delay and defraud creditors of Amiga Washington, including  
6 Hyperion. Furthermore, on information and belief, KMOS failed to provide reasonably  
7 equivalent value for the “intellectual properties,” including the “Amiga” trademarks that are  
8 allegedly covered by the Amiga Washington/KMOS Contract.

9           28.     Hyperion completed AmigaOS 4.0 as required by Annex I of the Agreement no  
10 later than December 27, 2004. Hyperion gave timely notice of this completion in 2004.

11           29.     By June 27, 2005, neither Amiga Washington nor any of its purported  
12 successors-in-interest had paid to Hyperion the \$25,000 required by §§3.01 and 2.06 of the  
13 Agreement.

14           30.     By June 27, 2005, neither Amiga Washington nor any of its purported  
15 successors-in-interest had issued a substantially new version of the Classic Amiga OS for the  
16 Target Hardware.

17           31.     Hyperion specifically alleges that it went well beyond its contractual obligations  
18 under the Agreement—at substantial expense to itself—and unquestionably met its obligations  
19 to exercise “best efforts,” both with respect to releasing AmigaOS 4.0 as promptly as possible,  
20 and with respect to obtaining the widest possible rights from third party developers.

21           32.     Because Amiga Washington and its purported successors in interest failed to pay  
22 \$25,000 to Hyperion by the required date, Amiga Washington failed to timely exercise the  
23 “buy-in option” in §3.01. Hyperion, therefore, has no obligation to provide to Amiga  
24 Washington the Object Code, Source Code and intellectual property of OS 4.0 pursuant to and  
25 within the limits set out in §2.06 of the Agreement.



V. CAUSES OF ACTION

CAUSE NO. 1: DECLARATORY JUDGMENT UNDER RCW CH. 7.24

Hyperion realleges paragraphs 1 through 32 as if restated in full herein.

33. Pursuant to RCW Ch. 7.24 *et seq.*, Hyperion seeks a declaratory judgment under the November 3, 2001 Agreement that:

(a) Under the self-executing provisions of §2.07 of the Agreement, Hyperion and Eyetech (collectively referred to as the “Amiga One Partners”) received an exclusive, perpetual, world-wide and royalty free right and license to develop (at their sole expense), use, modify and market the Software and OS 4 under the Amiga OS trademark upon Amiga Washington’s insolvency, and that Amiga Washington was insolvent prior to and on April 24, 2003;

(b) Amiga Washington did not comply with the requirement of §7.12 of the Agreement that the Amiga One Partners and Amiga Washington each provide prior written consent before the purported assignment of Amiga Washington’s rights under the Agreement could occur;

(c) Even if one assumes that Amiga Washington was not insolvent and that all required parties gave their written consent to any alleged transfer of Amiga Washington’s rights, neither Amiga Washington nor any of its purported successors paid the \$25,000 within the six-month time period required by §3.01 to “buy in” to OS 4. Thus, no entity has acquired the right to obtain the Object Code, Source Code and intellectual property of OS 4.0 pursuant to and within the limits set out in §2.06 of said Agreement. Instead, Hyperion possesses all ownership and title in the enhancements of and additions to the Software effected by Hyperion and its subcontractors pursuant to the terms of the Agreement;

(d) Even if one assumes that Amiga Washington was not insolvent and that all required parties gave their written consent to any alleged transfer of Amiga Washington’s rights, the self-executing provisions of §2.08 of the agreement transferred to Hyperion and Eyetech an exclusive, perpetual, worldwide right and license to develop, use, modify and

1 market the Software and OS 4 under the Amiga OS trademark at their sole expense because  
 2 Amiga Washington and its purported successors failed to release a substantially new version of  
 3 the Classic Amiga OS for the Target Hardware within six months of Hyperion's completion of  
 4 OS 4.0;

5 (e) Even if one assumes that Amiga Washington was not insolvent and that all  
 6 required parties gave their written consent to any alleged transfer of Amiga Washington's  
 7 rights, (i) Hyperion exercised its "best efforts" as required of it under the Agreement, and (ii),  
 8 Hyperion has at no time, and will not in the future in its dealings with ACube Systems Srl,  
 9 violate the provisions of its license under the November 3, 2001 Agreement. Therefore there is  
 10 no valid basis upon which to terminate Hyperion's rights under the Agreement; and

11 (f) Hyperion is entitled to whatever other declaratory relief is required to fully  
 12 adjudicate the rights of the parties to the Agreement pursuant to RCW 7.24.010, .020, .030,  
 13 .050, .080, and .090.

14 34. In addition to a declaratory judgment in its favor, Hyperion is entitled to an  
 15 award from Amiga Washington of its attorney's fees and expenses under §7.07 of the  
 16 Agreement and its costs under RCW 7.24.100. While the value of the requested declaratory  
 17 relief will be proven at trial, it is alleged to be in excess of \$75,000.

## 18 **CAUSE NO. 2: BREACH OF CONTRACT**

19 Hyperion realleges paragraphs 1 through 34 as if restated in full herein.

20 35. Amiga Washington breached its contractual obligations under the Agreement in  
 21 numerous ways. For example, Amiga Washington breached its warranty that it was the owner  
 22 of all intellectual property rights in the Software, defined to include but not be limited to OS  
 23 3.1, 3.5 and 3.9, when it in fact did not own said rights. (Exhibit D, Agreement, §4.01.) On  
 24 information and belief, Amiga Washington and its insiders knew it could not comply with these  
 25 warranty obligations at the time the Agreement was entered into.  
 26

1           36. Because Amiga Washington breached its warranties of ownership, defendant  
2 further breached its obligations under the Agreement by failing both to deliver OS 3.1, 3.5 and  
3 3.9 source code free of encumbrances and, with respect to OS 3.5 and 3.9, by outright failing to  
4 produce that code in any form. This breach caused Hyperion substantial damage because  
5 Hyperion was then forced to enter into dozens of contracts with the actual owners of that  
6 Software and acquire the liabilities attendant thereto.

7           37. Amiga Washington then further breached its duties of indemnification under  
8 §4.02 of the Agreement because it failed to hold Hyperion harmless from those damages, costs  
9 and expenses.

10           38. Amiga Washington further breached its contractual obligations by wrongfully  
11 interfering with Hyperion's rights under §2.01 of the Agreement, which included the right by  
12 Hyperion to retain all revenues from the distribution of OS 4.0. Specifically, in 2001 and 2002  
13 Amiga Washington breached Hyperion's rights by engaging in illicit discount voucher schemes  
14 aimed at future end-consumers of OS 4.0. Specifically, Amiga Washington issued \$100  
15 "Amiga Party Pack" and \$50 "I am Amiga" vouchers designed to induce consumers to pay  
16 Amiga Washington \$100 or \$50 in anticipation of the release of OS 4.0. Amiga Washington  
17 represented that in exchange for these vouchers it would either grant a discount or provide free  
18 copies of software, e.g. OS 4.0, which it did not own. By Amiga Washington's own  
19 admissions, it raised at least \$90,000 from consumers in this manner. Hyperion never endorsed  
20 these schemes, was never paid any of the money, and has been damaged both in its reputation  
21 and monetarily as it was confronted with demands from these consumers for benefits that  
22 Hyperion was not in a position to provide. The amount of these damages resulting from Amiga  
23 Washington's breach of §2.01 of the Agreement will be proven at trial, but they are alleged to  
24 be in excess of \$90,000.

25           39. Discovery is ongoing and additional breaches of contract by may be discovered.  
26



40. Hyperion accordingly seeks damages from Amiga Washington in an amount to be determined at trial, but alleged herein to be in excess of \$90,000, plus attorney's fees and expenses.

## VI. PRAYER FOR RELIEF

WHEREFORE, Hyperion requests the following relief:

1. For declaratory judgment against Amiga Washington that:

(a) Under the self-executing provisions of §2.07 of the Agreement, the Amiga One Partners received an exclusive, perpetual, world-wide and royalty free right and license to develop (at their sole expense), use, modify and market the Software and OS 4 under the Amiga OS trademark upon Amiga Washington's insolvency, and that Amiga Washington was insolvent prior to and on April 24, 2003;

(b) Amiga Washington did not comply with the requirement of §7.12 of the Agreement that the Amiga One Partners and Amiga Washington each provide prior written consent before the purported assignment of Amiga Washington's rights under the Agreement could occur;

(c) Even if one assumes that Amiga Washington was not insolvent and that all required parties gave their written consent to the transfer of Amiga Washington's rights, neither Amiga Washington nor any of its purported successors paid the \$25,000 within the six-month time period required by §3.01 to "buy in" to OS 4. Thus, no entity has acquired the right to obtain the Object Code, Source Code and intellectual property of OS 4.0 pursuant to and within the limits set out in §2.06 of said Agreement. Instead, Hyperion possesses all ownership and title in the enhancements of and additions to the Software affected by Hyperion and its subcontractors pursuant to the terms of the Agreement;

(d) Even if one assumes that Amiga Washington was not insolvent and that all required parties gave their written consent to the transfer of Amiga Washington's rights, the self-executing provisions of §2.08 of the agreement transferred an exclusive, perpetual,

1 worldwide right and license to develop, use, modify and market the Software and OS 4 under  
2 the Amiga OS trademark at their sole expense because Amiga Washington and its purported  
3 successors failed to release a substantially new version of the Classic Amiga OS for the Target  
4 Hardware within six months of Hyperion's completion of OS 4.0;

5 (e) Even if one assumes that Amiga Washington was not insolvent and that all  
6 required parties gave their written consent to the transfer of Amiga Washington's rights, (i)  
7 Hyperion exercised its "best efforts" as required of it under the Agreement, and (ii), Hyperion  
8 has at no time, and will not in the future in its dealings with Aube Systems Sra, violate the  
9 provisions of its license under the November 3, 2001 Agreement. Therefore there is no valid  
10 basis upon which to terminate Hyperion's rights under the Agreement; and

11 (f) Hyperion is entitled to whatever other declaratory relief is required to fully  
12 adjudicate the rights of the parties to the Agreement pursuant to RCW 7.24.010, .020, .030,  
13 .050, .080, and .090.

14 2. For an award of damages for the breaches of the Agreement committed by  
15 Amiga Washington, with said relief including but not limited to a grant of title to and  
16 possession over any and all intellectual property (e.g., possibly the Amiga trademarks) that may  
17 remain in the possession of defendant;

18 3. For an award of fees and expenses in bringing this suit as permitted by contract,  
19 statute and equity against Amiga Washington; and

20 4. For such other relief as the Court deems appropriate.

21 DATED this 31<sup>st</sup> day of October, 2007.

22 KINSEL LAW OFFICES, PLLC

23  
24 By: William A. Kinsel  
25 William A. Kinsel, WSBA #18077  
26 Attorney for Plaintiff Hyperion VOF

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Corporations: Registration Detail

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## Corporations Division - Registration Data Search

## AMIGA, INC.

UBI Number	601983734
Category	Regular Corporation
Profit/Nonprofit	Profit
Active/Inactive	Inactive
State of Incorporation	WA
Date of Incorporation	09/30/1999
License Expiration Date	09/30/2004

## Registered Agent Information

Agent Name	CAIRNCROSS & HEMPELMANN PS
Address	524 SECOND AVE #500
City	SEATTLE
State	WA
ZIP	981042323

## Special Address Information

Address
City
State
Zip

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## Corporations Division - Registration Data Search

## AMINO DEVELOPMENT CORPORATION

UBI Number 601983734  
 Category Regular Corporation  
 Profit/Nonprofit Profit  
 Active/Inactive Active  
 State of Incorporation WA  
 Date of Incorporation 09/30/1999  
 License Expiration Date 09/30/2008

## Registered Agent Information

Agent Name CAIRNCROSS & HEMPELMANN PS  
 Address 524 SECOND AVE #500  
 City SEATTLE  
 State WA  
 ZIP 981042323

## Special Address Information

Address  
 City  
 State  
 Zip

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Corporations: Registration Detail

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Category	Regular Corporation
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Active/Inactive	Active
State of Incorporation	WA
Date of Incorporation	09/30/1999
License Expiration Date	09/30/2008

#### Registered Agent Information

Agent Name

Address

City

State

ZIP

#### Special Address Information

Address

City

State

Zip

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**(OEM) LICENSE AND SOFTWARE DEVELOPMENT AGREEMENT**

This agreement (this "Agreement") is made and entered into as of this 03 day of <sup>November</sup>~~October~~ 2001,

by and between:

1. Amiga Inc. (hereafter: "Amiga"), a State of Washington, U.S.A. corporation with its administrative seat at 34935 SE Douglas Street, Snoqualmie, WA 98065, USA

and

2. Hyperion VOF (hereafter: "Hyperion"), a Belgian corporation with its administrative seat at Brouwersstr. 1B, B-3000 Leuven;

3. Eyetech Group Ltd. (hereafter: "Eyetech"), an English corporation with its administrative seat at The Old Bank, 12 West Green, Stokesley, N. Yorkshire, TS9 5BB, England.

**RECITALS**

**WHEREAS** Amiga intends to release a new version of its Classic Amiga operating system tentatively called "Amiga OS 4.0";

**WHEREAS** Amiga has decided to contract with Eyetech for the development of the Amiga One product;

**WHEREAS** Hyperion has partnered with Eyetech Ltd. in the AmigaOne project;

**WHEREAS** the successful roll-out of the AmigaOne hardware hinges in part on the availability of Amiga OS 4.0;

**WHEREAS** Amiga has decided to contract with Hyperion for the development of Amiga OS 4.0;

**NOW, THEREFORE**, for good and valuable consideration, receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound, the parties hereto agree as follows:

**Article I.  
DEFINITIONS**

**1.01 Definitions.** For purposes of this Agreement, in addition to capitalized terms defined elsewhere in this agreement, the following defined terms shall have the meanings set forth below:

"Amiga One" means the PPC hardware product developed by Escena GmbH for the Amiga One Partners, initially intended to operate in conjunction with an Amiga 1200;

"Amiga One Partners" means Eyetech and Hyperion collectively;

"Amiga OS Source Code" means the Source Code of the Classic Amiga OS including but not limited to the Source Code of Amiga OS 3.1, 3.5 and 3.9;

"Classic Amiga OS" means the operating system owned and developed by Amiga Inc. and largely based on the

operating system shipped with the Commodore Amiga line of computers sold in the 1980's and early '90's;

"Confidential information" means any business and technical information of a party hereto that is treated as confidential by such party and furnished to the other party, and which includes but is not limited to computer programs, Source code, Object code, algorithms where such information, if in writing, is identified in writing to the other party as confidential prior to or concurrently with the transmission of such information, and, if conveyed orally, is identified orally as confidential prior to or concurrently with the transmission of such information and confirmed in writing within seven (7) days thereafter. Source Code is hereby designated as Confidential Information.

"Object Code" means software in a machine readable form that is not convenient to human understanding of the program logic, and that can be executed by a computer using the appropriate operating system without compilation or interpretation. Object Code specifically excludes Source Code.

"OS 4.0" means the version of the Classic Amiga OS developed by Hyperion pursuant to this Agreement with the functionality described in Annex I hereof;

"OS 4" means any version of the Classic Amiga OS developed by Hyperion pursuant to this Agreement;

"Software" or "the Software" means the Source Code of Amiga OS 3.1 and the upgrades of Amiga OS 3.1 including but not limited to OS 3.5 and 3.9 and associated "Boing Bags";

"Source Code" means software when written in a form or language understandable to humans, generally in a higher level computer language, and further including embedded comments in the English language.

"Target-Hardware" means the PPC based hardware developed and marketed for the Amiga platform including but not limited to the hardware developed and marketed by Phase 5, DCE and the AmigaOne hardware developed by Escena under contract with the Amiga One Partners.

## ARTICLE II. OBLIGATIONS OF THE AMIGA ONE PARTNERS; APPOINTMENT

**2.01 Appointment.** Amiga hereby grants the Amiga One Partners a right and license to use and modify the Software and an exclusive right and license to market and distribute OS 4 as a standalone version for the Target Hardware and as an OEM version shipped with the Amiga One. Amiga furthermore grants the Amiga One Partners a right and license to use the Amiga trademarks in conjunction with the Amiga One. Hyperion shall develop Amiga OS 4.0 for the Target-Hardware with the minimal feature-set set out in Annex I and pursuant to the development guidelines set out in Annex I. Amiga acknowledges and accepts that Hyperion will bring in third party contractors (Annex II) to fulfill its contractual obligations.

**2.02 Timeline.** Hyperion shall use best efforts to ensure that Amiga OS 4.0 is ready for release before March 1, 2002.

### **2.03 Royalties.**

(A) **Standalone version.** Other than for OS 4.0 for which no royalties shall be due by Hyperion, Hyperion shall pay Amiga a royalty of 20 USD for each standalone version of any subsequent versions of OS 4 developed by Hyperion pursuant to this Agreement.

(B) **OEM version.** Eyetech shall pay Amiga a royalty of 25 USD per unit of Amiga OS 4, said royalty shall moreover be considered payment in full for the Amiga One Partners right and title to use the Amiga trademarks in conjunction with the Amiga One.

(C) **Upgrades.** In the event upgrades are made available at a price which exceeds a reasonable amount for shipping and administrative costs, Hyperion and/or Eyetech shall pay Amiga a pro rata royalty which shall be calculated by comparing the suggested retail price (SRP) in Germany of a standalone version of OS 4 with the

SRP in Germany of the upgrade package.

**2.04 Records and Inspection.** During the term of this Agreement, the AmigaOne Partners shall deliver to Amiga bi-monthly reports within thirty (30) days after the end of bi-monthly period setting forth the sales of the OS 4. Following such bi-monthly report, accrued royalties shall promptly be wired to Amiga. Amounts of less than Two Thousand (2000) USD shall be carried over to the next bi-monthly period. The AmigaOne Partners shall maintain or acquire complete and accurate records of sales to permit the determination of the sums payable by the AmigaOne Partners to Amiga. The AmigaOne Partners shall, upon fourteen (14) days advance written notice by Amiga, permit reasonable inspection of such records by Amiga or its outside accountants. The finding of errors in such records shall not of itself constitute a material breach of this Agreement. Amiga shall bear all of its own costs of such inspection even if it finds errors in the Amiga One Partners' records unless the inspection reveals more than 5% underpayment on the part of one of the Amiga One Partners in which case said partner shall bear the costs of inspection which shall not be unreasonable.

**2.05 Interest.** Interest shall accrue on any delinquent amount owed by the AmigaOne Partners at the rate of one percent (1%) per month, or the maximum rate permitted by the law of the State of Washington, U.S.A, whichever is less.

**2.06 Ownership.** Amiga shall retain ownership of the Software. Other than the rights and licenses granted to the AmigaOne Partners and Hyperion and Eyetech individually, nothing in this Agreement shall be construed as limiting Amiga's right and title in the Software. At any time prior to the completion of OS 4.0 and no later than six (6) months thereafter and provided Amiga makes the payment pursuant to article 3.01 hereof, Hyperion shall transfer all Source Code, interest and title in OS 4.0 to Amiga to the extent it can do so under the agreements concluded with third party contractors. Hyperion shall use best efforts to secure the widest possible rights from third party contractors. Amiga hereby acknowledges and accepts that some third parties may only grant an Object Code license or may otherwise restrict the rights granted to Hyperion.

**2.07 Bankruptcy.** In the event Amiga files for bankruptcy or becomes insolvent, the Amiga One Partners are granted an exclusive, perpetual, world-wide and royalty free right and license to develop (at their sole expense), use, modify and market the Software and OS 4 under the "Amiga OS" trademark.

**2.08 Contingency.** In the event Amiga decides to halt development of the Classic Amiga OS for the Target Hardware, the Amiga One Partners are granted an exclusive, perpetual, worldwide right and license to develop, use, modify and market the Software and OS 4 under the "Amiga OS" trademark and at their sole expense. Royalties due to Amiga shall be calculated in accordance with article 2.03 hereof. Amiga shall be deemed to have halted development of the Classic Amiga OS in the event that no substantially new version of the Classic Amiga OS for the Target Hardware is released within 6 (six) months after the completion of OS 4.0 by Hyperion.

### ARTICLE III. OBLIGATIONS OF AMIGA.

**3.01** Amiga may, at any time but no later than six (6) months after the completion of OS 4.0, elect to pay Hyperion Twenty Five Thousand USD (25,000 USD) in order to acquire the Object Code, Source Code and intellectual property of OS 4.0 pursuant to and within the limits set out in article 2.06 hereof. Said payment will first be applied against the balance of any outstanding invoices by the AmigaOne Partners vis à vis Amiga. In the event Amiga does not elect to carry out the aforementioned payment, all ownership and title in the enhancements of and additions to the Software effected by Hyperion and its subcontractors pursuant to this Agreement, shall rest with Hyperion.

**3.02** Amiga shall provide Hyperion with all necessary Source Code and documentation to allow Hyperion to carry out its contractual obligations under this Agreement.

### ARTICLE IV. WARRANTIES AND INDEMNIFICATIONS



**4.01 Warranty and Covenant of Original Development by Amiga.** Amiga represents, warrants and covenants that: (a) it is and shall be the owner of all intellectual property rights in the Software under copyright, patent, trademark, trade secret, and other applicable law; (b) the Software delivered or licensed to the Amiga One Partners hereunder is and shall be of original development by employees of Amiga in the conduct of their duties as employees or by third parties who prepared such materials for Amiga pursuant to a contract between Amiga and said third parties and who assigned to Amiga his or its entire right, title and interest in the Software; (c) the Software does not and shall not infringe or otherwise violate any patent, copyright or trade secret of any third party anywhere in the world; (d) it has not received, as of the date of the delivery of the Software to Hyperion, actual notice of any claim that the Software or the use thereof infringes any intellectual property right of any third party anywhere in the world or that any third party has any proprietary interest in or to the software, or any invention, patent, work of authorship, copyright, trade secret, know-how or a similar right to the software.

**4.02 Indemnification.** Amiga shall indemnify and hold Hyperion harmless from and against all claims, suits, demands, actions, judgments, penalties, damages, costs and expenses (including attorney's fees and costs), losses or liabilities of any kind arising from a claim that the Software infringes a patent, copyright or other intellectual property right of any other person anywhere in the world.

**4.03 Indemnification.** Hyperion shall indemnify and hold Amiga harmless from and against all claims, suits, demands, actions, judgments, penalties, damages, costs and expenses (including attorney's fees and costs), losses or liabilities of any kind arising from a claim that OS 4.0 or any other version of the Classic Amiga OS developed pursuant to this Agreement infringes a patent, copyright or other intellectual property right of any other person anywhere in the world.

**4.04 Notice.** Amiga and Hyperion shall promptly notify the other party of any actions brought or claims asserted whose outcome may affect the rights granted to Hyperion and/or Amiga pursuant to this Agreement.

**4.05 Organization and Standing.** Hyperion is a corporation duly organized, validly existing and in good standing under the laws of the kingdom of Belgium. Amiga is a corporation duly organized, validly existing and in good standing under the laws of the State of Washington, USA. Eyetech is a corporation duly organized, validly existing and in good standing under the laws of England.

**4.06 Power to grant rights.** Amiga represents and warrants that: (a) it has the right, power and authority to grant the rights and licenses granted in this Agreement and fully perform its obligations hereunder; (b) the making and performance of this Agreement by Hyperion does not and shall not violate any separate agreement, right or obligation existing between Amiga and any third party; and (c) there are no outstanding liens, security interests or other encumbrances of any kind whatsoever in or to the Software or to any of the intellectual property rights therein.

## ARTICLE V. CONFIDENTIALITY

(a) Each party may disclose to another party Confidential Information as may be necessary to further the performance of this Agreement. Each party agrees to treat another's Confidential Information in the manner prescribed herein.

(b) Amiga and the Amiga One Partners shall protect any other party's Confidential Information as follows:

(I) Except as specifically provided herein or otherwise permitted by the other parties in writing, any party may disclose Confidential Information of another party only to those employees and agents required to have knowledge of same to perform their duties pursuant to this Agreement. Each party shall require each such employee or agent to enter into a written non-disclosure agreement containing provisions substantially consistent with the terms hereof prior to the disclosure of Confidential Information to such employee or agent. Each party shall treat the Confidential Information of another party with the same degree of care as it protects its own Confidential Information, and in no event less than a reasonable degree of care.

(II) Except as may specifically be permitted herein, upon the termination of this Agreement, each party shall



return to the other, or, if so requested, destroy all Confidential Information of the other party in its possession or control, except such Confidential Information as may be reasonably necessary to exercise the rights that survive the termination of this Agreement.

(c) The foregoing obligations of confidentiality shall not apply with respect to any party's Confidential Information to the extent that it:

(I) is within or later falls within the public domain through no fault of the party receiving the Confidential Information; or

(II) is, or becomes, available to the receiving party from third parties, who, in making such disclosure, have breached no written confidentiality agreement; or

(III) is previously known by the receiving party;

(IV) is independently developed by or for the receiving party without use of the Confidential Information.

(d) In the event any party receives a request to disclose any Confidential Information under the terms of a valid and effective subpoena or order issued by a court of competent jurisdiction or a governmental body, such party shall (I) immediately notify the party that furnished such Confidential Information of the existence, terms and circumstances surrounding such request, (II) consult with such party on the advisability of taking legally available steps to resist or narrow such request, and (III) exercise reasonable best efforts, at the expense of the party producing such Confidential Information, to obtain an order or other reliable assurance that confidential treatment will be accorded to such portion of the Confidential Information as may be disclosed.

## ARTICLE VI. TERM; TERMINATION

6.01 **Term.** This Agreement shall continue indefinitely, unless terminated as provided herein

6.02 **Termination for Material Breach.** Any party may, at its option, terminate this agreement in the event of a material breach by another party. Such termination may be effected only through a written notice to another party, specifically identifying the breach or breaches on which termination is based. Following receipt of such notice, the party in breach shall have thirty (30) days to cure such breach or breaches and this Agreement shall terminate in the event that such a cure is not made by the end of such period. The claim of material breach justifying termination shall be limited to the specific breached set forth in the above written notice as explained, supported and negated by evidence.

6.03 **Consequences of Termination.** In the event this Agreement is terminated in accordance with article 6.02 hereof, this Agreement shall remain in force with respect to the parties other than the party found in material breach of this Agreement pursuant to article 6.02 hereof. Articles IV, V, VI and VII shall in any event survive termination of this Agreement.

## Article VII. Miscellaneous

7.01 **Four Corners.** This Agreement collectively sets forth the entire agreement and understanding between the parties hereto with respect to the subject matter hereof and, except as specifically provided herein, supersedes and merges all prior oral and written agreements, discussions and understandings between the parties with respect to the subject matter hereof, and neither of the parties shall be bound by any conditions, inducements or representations other than as expressly provided for herein.

7.02 **Independent Contractors.** In making and performing this Agreement, Amiga and the Amiga One Partners act and shall act at all times as independent contractors and nothing contained in this Agreement shall be

construed or implied to create an agency, partnership or employer and employee relationship between Amiga and the AmigaOne Partners. At no time shall either party make commitments or incur any charges or expenses for or in the name of the other party.

**7.03 Amendments; Modifications.** No amendment, modification or attempt to supersede or cancel any of the terms, covenants, representations, warranties or conditions hereof shall be effective unless such amendment, modification or direction to supersede or cancel such term, covenant, representation, warranty or condition is executed in writing by Amiga and Hyperion or, in the case of a waiver, by or on behalf of the party waiving compliance. No waiver by any party of any condition, or of any breach of any term, covenant, representation or warranty contained in this Agreement, in any one or more instances, shall be deemed to be a further or continuing waiver of any such condition or breach or a waiver of any other condition or of any breach of any other term, covenant, representation or warranty.

**7.04 Severability.** The provisions of this Agreement shall be severable, and if any of them are held invalid or unenforceable for any reason, such provision shall be adjusted to the minimum extent necessary to cure such invalidity. The invalidity or unenforceability of one or more of the provisions contained in this Agreement shall not affect any other provisions of this Agreement.

**7.05 Waivers.** The waiver of any breach of any provision of this Agreement or failure to enforce any provision hereof shall not operate or be construed as a waiver of any subsequent breach.

**7.06 Governing Law.** This Agreement shall be governed by and interpreted in accordance with the internal laws of Washington State, USA without regard to conflicts of laws principles. The obligations set forth in this Agreement are intended to supplement and not to supersede the protections afforded Amiga under the Uniform Trade Secrets Act or similar law or laws as may be in effect from time to time within the State of Washington.

**7.07 Dispute settlement.** Before filing any suit (with the exception of injunctive relief related to the protection of intellectual property) both parties shall submit to mediation to be completed within 30 days after written notice. In the event of any dispute between the parties that arises out of this Agreement, the substantially prevailing party shall be entitled to reimbursement for its attorneys' and experts' costs, fees and expenses. The provisions of this Agreement shall not be construed as limiting any rights or remedies that either party may otherwise have under applicable law and shall be in addition to all other rights and remedies of such party, including any which may arise out of any other written agreement involving the parties.

**7.08 Forum.** The exclusive jurisdiction and venue of any lawsuit between the parties arising under this Agreement or out of transactions contemplated hereby shall be the Superior Court of Washington for King County or the United States District Court for the Western District of Washington at Seattle and each of the parties hereby submits itself to the exclusive jurisdiction and venue of such court for the purposes of such lawsuit.

**7.09 Counterparts.** This Agreement may be executed in any number of counterparts, each of which when so executed shall be deemed to be an original and all of which when taken together shall constitute one Agreement.

**7.10 Signatures by Facsimile.** Any facsimile signature of any party hereto shall constitute a legal, valid and binding execution hereof by such party.

**7.11 Construction.** This Agreement is the product of joint draftmanship and shall not be construed against one party more strictly than against another.

**7.12 Effect.** The Agreement shall be binding upon and inure to the benefit of each party hereto, and their successors and assigns. Neither party shall assign or subcontract the whole or any part of this Agreement without the other party's prior written consent.

**7.13 Headings.** The headings in this Agreement are inserted merely for the purpose of convenience and shall not affect the meaning or interpretation of this Agreement.

IN WITNESS WHEREOF, the parties, by their authorized representatives, have executed this Agreement.

FOR AMIGA INC

BY: 

NAME (PRINTED) Barrie Jon Moss

TITLE CTO, Amiga

FOR HYPERION VOF

BY: 

NAME (PRINTED) BEN HERMANS

TITLE Managing partner

FOR EYETECH GROUP LTD

BY: 

NAME (PRINTED) A.M. Redtenbacher

TITLE Managing Director

## OS 4 Schedule and Feature List

*Hans-Jörg Frieden,  
Senior software engineer, Hyperion Entertainment*

This document describes the tasks required to get to OS 4 running on the AmigaOne and CyberStorm PPC hardware. Tasks are categorized as *essential*, *important* or *optional* depending on their importance. *Essential* tasks must be carried out to get bare minimum functionality. *Important* tasks are task that are not essential for functionality, but are to be considered so fundamental that OS 4 would rather be incomplete without them. Finally, *optional* tasks are things that can be considered if time and resources don't run out. They would be nice to have, but not critical.

## Design Goals of OS 4

The following summarizes the desired design goals of OS 4.0:

- Essentially, OS 3.9 running on the AmigaOne and CyberStorm PPC without using the 68k CPU, using a 68k Emulator, possibly the JIT compiler, but may work with a non-JIT for starters. The kernel is a PPC native Exec with Haage & Partner's emulator (or the JIT emulator under development by a third party) running instead of the on-board 68k.
- As much PPC-native as necessary as soon as possible. This in combination with the 68k emulation (as opposed to cache-flushing needed to keep both CPU's memory image in sync) would mean a tremendous boost in performance, also carried by the fact that the memory interface and PCI/AGP bus can achieve a substantially faster throughput as the old Zorro III or PCI-Bridges. Not to mention that the CPU will be a good deal faster.
- New file system replacing the old FFS, preferably PPC-Native if possible. The old file system has turned out to be one of the major bottlenecks. It is outperformed by e.g. Linux ext2 by a factor of 10.
- Virtual Memory System. Most modern games, most modern applications require a tremendous amount of memory. Having virtual memory as part of the system is a key factor for tighter development schedules.
- Runs on the AmigaOne as well as the "classic" hardware. Blizzard version probably undesirable/impossible (performance reasons), but CyberStorm PPC required. Anything else would mean replacing one small market of weak machines with another small market with strong machines. The key factor must be for software developers to widen the market, making Amiga development feasible, and offer an upgrade path for A1200 owners to a top-of-the-line hardware.

## Tasks

Task: Port Exec to PPC, adapt WarpOS and the 68K emulator  
 Priority: Essential  
 Prerequisite: AmigaOne  
 Required for: AmigaOne  
 Performed by: Alexander Lohrmann, Almos Rajnai, Hyperion & Haage&Partner  
 Estimated time: ?

It was decided that the cleanest and technologically most satisfying solution is a PPC port of Exec which handles both the PPC tasks and the emulated 68K tasks.

Porting WarpOS will essentially mean writing a new warphw.library. This should be relatively straightforward, since this was one of the design goals for WarpOS. Once this is done, the emulator must be adapted to run on this. Possibly, there would need to be some adaptations to the G3 processor.

The emulator would either be the 68K emulator by Haage & Partner or the JIT emulator by Almos Rajnai or a combination of both. Whilst JIT emulation is to be preferred because of its higher speed, it is unclear at this point if the JIT emulator will be finished in time to coincide with release of OS 4.0.

Task: CyberStorm SCSI driver / SCSI PCI card  
 Priority: Essential  
 Prerequisite: n/a  
 Required for: OS 4 on classic hardware + Amiga One SCSI on PCI support  
 Performed by: Ignatios Souvatzis  
 Estimated time: 2 months

Work on the CyberStorm SCSI drivers is already underway. The basic motivation is that the original cybppc.device does not work on the emulator due to MMU page size restrictions. Furthermore this driver may be later adapted to work with PCI SCSI cards as a lot of existing users have SCSI rather than IDE based hardware.

Task: Disk drivers for the AmigaOne hardware  
 Priority: Essential  
 Prerequisite: AmigaOne hardware  
 Required for: AmigaOne only  
 Performed by: ?  
 Estimated time: ?

Since this task might be very similar to the aforementioned CyberStorm SCSI driver, it might be conceivable to contract Mr. Souvatzis for this task, too. Maybe a solution would be to use a PCI SCSI controller in the AmigaOne with the same chipset as the CyberStorm PPC.

Task: Picasso96-Drivers for the CyberVisionPPC and possibly G-REX/Predator  
 Picasso96-Drivers for the Matrox G450/G550, Voodoo 3/4/5, Permedia 2  
 Priority: Essential



Prerequisite: n/a  
 Required for: OS 4 on classic hardware  
 Performed by: Mark Olsen, Alexander Kneer, Tobias Abt  
 Estimated time: ?

The Picasso96 RTG system must fully support all hardware that is targeted for AmigaOS 4. Therefore the most frequently used card, the CyberVisionPPC, must also be supported. Work on this is already underway, but made more complicated by the fact that the CSPPC's flash rom already sets up some of the Permedia2 for the passthrough option.

With Picasso96 drivers already present for the Prometheus PCI bridge as well as the Mediator solution (albeit still with the issue of non-conformance with the Picasso96 authors' license), the only remaining PCI boards to be supported would be G-REX or the Predator. Support of these boards requires cooperation with DCE/Thomas Dellert.

Supported graphics card for OS4 should at the least cover Permedia2, Voodoo 3 and possible S3 ViRGE (the latter because of its still wide-spread use and cheap PCI versions).

Task: Integration of changes in OS 3.5 and OS 3.9 into the 3.1 CVS  
 Priority: Essential  
 Prerequisite: n/a  
 Required for: OS 4  
 Performed by: Olaf Barthel and/or others.  
 Estimated time: ?

Changes made after OS 3.1 must be incorporated into the main tree in the CVS repository. If a new kickstart ROM is desired, this would include the kickstart source code as well as all modifications done by the SetPatch program.

There might be license issues involved with this, for example for the Reaction GUI system. License issues are outside the scope of this document.

Task: Warp3D/Ami3D drivers for all supported graphics cards  
 Priority: Important to Essential  
 Prerequisite: G550, working G450, other cards including Permedia 2, Voodoo 3/4/5  
 Required for: OS 4  
 Performed by: Hans-Jörg Frieden, Thomas Frieden  
 Estimated time: 1.5 month per card (assuming full-time work, partially done)

All graphics cards supported by OS 4 should have proper 3D graphics support. Note that drivers for the Voodoo 3, Permedia2 and ViRGE graphics chips are already present. This means that essentially only the Matrox cards would need to be handled at this point.

Note that the estimated time for this task does not include changes on the API or naming scheme for Ami3D. However, the author's opinion on this is that for OS 4 the name "Warp3D" and the naming scheme "Warp3D.library" and "Warp3DPPC.library" should still be employed, and Ami3D should come with OS 4.2, or later as a boing bag for OS 4.

Task: OpenGL implementation based on Mesa  
 Priority: Important  
 Prerequisite: 3D hardware  
 Required for: OS 4.0  
 Performed by: Hans-Jörg Frieden, Thomas Frieden  
 Estimated time: 1.5 month

OpenGL is the only cross-platform API for handling 3D graphics (in contrast with Direct3D which is a proprietary Microsoft API). The availability of an OpenGL implementation would allow for simplified porting of OpenGL based games and applications to Amiga OS.

The proposed OpenGL implementation would be based on Mesa 4.0, an open source implementation of the OpenGL 1.3 specification (see: <http://mesa3d.sourceforge.net>)

Task: Fast File System rewrite  
 Priority: Essential  
 Prerequisite: n/a  
 Required for: OS 4  
 Performed by: Olaf Barthel  
 Estimated time: Already in beta-test

The rewrite of the fast file system should be regarded as a performance issue, and therefore essential. Since the



FFS2 is already in beta-test, the only remaining issue (besides bugfixes) is conversion to PPC.

Task: New TCP/IP Stack  
 Priority: Important to Essential  
 Prerequisite: n/a  
 Required for: OS 4  
 Performed by: Olaf Barthel  
 Estimated time: Already in beta-test

No operating system is complete without a tcp stack. Possibly old systems like Miami and/or Genesis/AmiTCP may not work anymore.

Like with the FFS2 conversion to PPC is still required.

Task: Virtual Memory System  
 Priority: Essential  
 Prerequisite: n/a  
 Required for: OS 4  
 Performed by: Haage & Partner  
 Estimated time: PPC conversion pending, probably low time requirements.

According to Haage & Partner, this task is already finished except for PPC conversion, which they said should be a very easy task.

Task: Minimal USB stack  
 Priority: Highly optional  
 Prerequisite: AmigaOne hardware/USB Hardware  
 Required for: OS 4 on AmigaOne, PCI USB card  
 Performed by: ?  
 Estimated time: ?

In order to enable stand-alone usage of the AmigaOne board, a minimal USB stack would be "a cool thing to have", i.e. It is not required to actually get the project done, but would a) allow the AmigaOne to be used in standalone mode and b) would help those people related to the project that do not have access to an A1200.

It might be possible to recycle some source code from Linux for that, or alternatively from a BSD clone because of the more liberal license (Microsoft ~~do~~ have a point about the GPL's viral properties).

As I said, this is highly optional.

Task: PPC-Native RTA system (AmiRTA)  
 Priority: Optional, probably OS 4.2 only  
 Prerequisite: n/a  
 Required for: n/a  
 Performed by: ?  
 Estimated time: ?

The current Audio systems is either hardware-dependent (audio device, direct DMA sound access) or AHI (and hence slow, 68k only, and with a lot of shortcomings). A new Audio system is absolutely required for at least OS 4.2, preferably earlier. This system should be able to cope with modern sound cards including 3D-Sound, and should be useful for both game programmers as well as multimedia programmers/studio musicians.

*What's wrong with AHI?* The API is divided in a low-level or high-level API. Both are rather awkward to use (for example, the low-level API only offers a callback mechanism that is triggered when a samples buffer *starts* playing, not when it finishes playing or reaches a certain position in the sample stream). Also, essential functionality is missing (for example, find out where the current sample playback position is). It also doesn't support any features of modern soundcards, or features of Amiga-specific sound cards like the Delfina. More importantly, it is known to be extremely slow. Its mixing routines are slow, so people roll their own. Even with sound cards is is much slower than the audio device (compare Shogo or Wipeout XL with or without AHI sound).

Task: Various enhancements (PPC datatypes, new HD Toolbox, AHI Soundblaster driver, clipboard functionality, various bugfixes)  
 Priority: Important, OS 4.0  
 Prerequisite: Hardware (Soundblaster EMU 101k)  
 Required for: OS 4.0  
 Performed by: Oliver Roberts, Andrea Vallinotto, Martin Blom, Philippe Ferrucci  
 Estimated time: ?

## General Notes

Olaf Barthel will function as the build master (apologies to Olaf because his name is mentioned quite frequently throughout this document).

Work should start as soon as possible on the CyberStorm PPC hardware. To work around the lack of a SCSI driver, the initial work can be carried out with an IDE disk connected to the A4000's internal IDE port.

Admittedly this is not the fastest option, but a workable one.

All parties involved should have read access to the CVS at all time, and also have access to nightly/weekly builds of the OS. A mailing list should be established. From time to time a meeting of all parties involved would be desirable.

## Future Work

It is clear that the primary concern should be to get OS 4 up and running on both the AmigaOne as well as the CyberStorm PPC cards as soon as possible. After the basic work is done, further updates and goodies may be made available as being bag upgrades on the road to OS 4.2. Listed below are a few things that come to mind:

**WarpInput.** WarpInput is an API drafted by Hyperion Entertainment (draft available on request. Contact Hans-JoergF@Hyperion-Entertainment.com), the purpose of which is to allow unified access to multimedia controller devices like Joysticks, steering wheels, trackballs and similar devices as well as the mouse and keyboard, from a multimedia or games programmers point of view. Could be renamed "AmiInput" (or some more prosaic name) and reused on AmigaDE and OS 4.2.

**PPC-Native GUI system.** At the moment it is painful to write fast applications with GUI's PPC-native. This is because every call like `intuition.library/GetMsg()` requires a cross-CPU context switch. Porting Boopsi to PPC and also porting a toolkit like Reaction would help this effort tremendously.

**Gradual changes to PPC code.** More OS code can be moved to PPC as time permits.

## Appendix: Migration to PPC-Native libraries (Proposal)

OS 4.0 could provide a way to implement PPC native libraries and devices incrementally, that is, allow libraries and devices to coexist as the original 68k version as well as a new PPC native version. This document tried to outline the principle.

There is one fixed address in the Amiga system. This is address 0x4, the ExecBase. To open a library (or a device, which is a special form of library) you call the Exec function `OpenLibrary` to obtain a base pointer. Currently there is only one address 0x4.

The principle doesn't change when the 68k emulator is involved – yet. However, this may be changed. An MMU setup will be able to write- and read-protect the first page of the Amiga memory. This way an exception is generated when a read access to the ExecBase pointer is performed. The system may now decide if a PPC task or an emulated 68k task tried to access the ExecBase and return a different pointer, one for the traditional ExecBase, and one for a special PPC version of ExecBase.

We now have a way to have a PPC-native Exec library that can provide the same functionality as the traditional Exec, plus new functions that are unique to the PPC/OS4 version. The new functionality can be implemented this way without interfering with 68k programs.

The new PPC Exec can now provide its own `OpenLibrary` function to open other PPC-native libraries.

Theoretically, there could be a PPC-Native version of e.g. Intuition, as well as a 68k version. However, this is not needed in all cases, and can be a continuous process.

If a PPC program tries to open a library that is not available as a PPC native library, the runtime system could generate a PPC stub library on the fly, by generating a library base with stubs that automatically hand over control to the appropriate 68k function via the emulator. The same could be done for 68k programs, making it possible to replace system libraries completely.

### Example:

Consider the following:

```
struct Library *ExampleBase;

ExampleBase = (struct Library *)OpenLibrary("example.library", 0);
if (!ExampleBase) exit(0);
```

```
// Call an example library function
int i = ExampleFunc(x,y);
```

What happens is the following: To call the `OpenLibrary` function, the compiler generates an address lookup at `_SysBase`, which is usually internally taken from address `0x00000004` at program startup. To call the function, the appropriate jump address is taken from the `_SysBase` minus the offset of the function. The resulting address is what the program jumps to. On a PPC this jump mechanism works a bit different from the 68k, but in principle this is the same. The only problem is that a PPC program wants PPC code that it can jump to, while a 68k program expects 68k code at the jump target.

The only solution is to have separate base pointers for libraries on PPC and 68k. For `exec.library` this is done by providing a PPC-native (or almost PPC-native) `exec` with all the functionality as its 68k counterpart. A PPC program reading address four will generate a page fault, and the runtime system will be able to return a different address than that of the 68k base.

As soon as this distinction is made, the rest of the system will fall in place automatically. On 68k, the call to `OpenLibrary` will proceed normally; on PPC, the PPC `exec` might for example look in a different directory (for example, `PPCLIBS:` as opposed to `LIBS:`), or add a prefix/suffix ("`ppcexample.library`" as opposed to "`example.library`"), or any other way to keep them apart.

In any case, the result is that a program can be compiled on both PPC and 68k from identical source code. Furthermore, the two `exec`'s can cooperate; for example, signaling, message passing and semaphores can be shared between them (remember that we can re-compile `exec` and also make modifications to the 68k version). In the above example, the `ExampleBase` pointer returned is a PPC library on the PPC side, and a 68k library on the 68k side. Furthermore, this system works dynamically, as will be outlined below.

### Migration

In order to allow incremental development of OS 4 into as much PPC native code as possible, the PPC version of the `OpenLibrary` call can actually verify if there is a PPC version of the library in question and selectively choose to *fail* if this is not the case, or instead construct a new library on-the-fly from the 68k counterpart. The PPC `exec` would look up the library on the 68k side, and if found, construct a new base and substitute all entries by simulated context switches into the 68k side, using the 68k emulator. If the need should arise, a scheme could be applied in which a PPC library need only implement parts of its own functionality, and make automatic context switches/emulator jumps into its 68k counterpart. This way for example a PPC version of `Intuition.library` could still use the 68k version of `OpenScreen`, but have its own PPC implementation of the more frequent calls like `OpenWindow` or similar. On a related topic, this scheme could be applied to time-critical functions in other system library, for example the drawing functions in `graphics.library`.

Likewise, the original library may be patched (either via `SetFunction` or via a newly compiled version) to use the new PPC version. This requires some possibility of the 68k emulator to inline PPC code, for example by executing an `INVALID` function, or by a jump to an uneven address (the emulator would strip out the LSB to get a new address with PPC code instead of 68k code).

To summarize the critical points:

1. The runtime system must be able to decide which "CPU" (either the PPC or the emulated 68k) is accessing address `0x00000004` to decide which value to return. If this is not possible, the new scheme could only be applied to programs written for OS4, and the startup code would need to be modified to ignore the usual base address and load a different one.
2. A scheme must be derived where both 68k and PPC libraries with the same name can co-exist. This does not only apply to on-disk representations, but also to in-memory representations. `Exec` in its current form stores all resident libraries in a list in its base; since we have two bases, there may be two lists. However, some libraries depend on being run from their `ROMTAG` or resident structure.
3. The runtime system must be able to construct a library on the fly at an `OpenLibrary` call. This is no problem at all, since this is exactly what is done when a library is first loaded from disk (`exec.library/MakeLibrary`, `exec.library/AddLibrary`). Furthermore, it must be able to decide which offsets are valid (i.e. Point to PPC code) and which must be redirected; setting these to invalid `NULL` jumps, or invalid instructions would be a possibility.
4. The emulator must be able to switch from 68k and from 68k to PPC quickly, so that replacing original 68k functions with PPC functions gives a noticeable speedup even for old 68k programs. Good speed-up candidates for this kind of optimizations are `dos.library`, `graphics.library`, `intuition.library` and `Picasso96API.library`. Since there is already work being done for a PPC-native `Picasso96`, this work can be recycled this way and even give "old" programs a bit of extra speed.

(Most notably for thinks like C2P/WritePixelFormat etc.)

Annex II - List of subcontractors (subject to change)

- Hyperion Entertainment VOF

Hans-Joerg Frieden, Thomas Frieden, Steffen Haeuser, Peter Annuss, Joe Sera etc.

- Haage & Partner GmbH

Jochen Becher, Markus Poelmann, Martin Steigerwaldt etc.

- Olaf Barthel

- P96 team (Kneer & Abt GbR)

Alexander Kneer, Tobias Abt

- Alexander Lohrmann

- Almos Rajnai

- Mark Olsen

- Ignatios Souvatzis

- Andrea Vallinotto

- Martin Blom

- Philippe Ferrucci

- Oliver Roberts